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71 Applicant: **Aktiebolaget SKF**

S-415 50 Göteborg(SE)

72 Inventor: **Lind, Björn**
Billdals Häggväg 8
S-427 00 Billdal(SE)

74 Representative: **Andreasson, Ralph et al**
c/o Aktiebolaget SKF
S-415 50 Göteborg(SE)

54 **Germicidal barrier.**

57 In a device for disinfecting a gap between two relatively movable elements (3,4) the elements are made of a heat resistant material in connection to the gap, and a heatable body (9) is arranged in connection to the gap so that the temperature of a medium in the gap can be raised to a germicidal level.

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GERMICIDAL BARRIER

The invention relates to a device of the kind stated in the introductory clause of claim 1.

In, for example, food and drug industry there are processes in which machines having movable parts are used. Therewith sealing problems may occur in connection to e.g. shaft passages through walls. The problem is particularly manifest if there is overpressure in the machine, whereby there is a risk for the matter present in the machines being pressed out into the environment through bearings and seals. This may contaminate the environment with microbes present in the process.

It is, in practice, impossible to obtain perfect sealing between two relatively movable elements. It has been suggested that an inert medium be pressed into a gap between the relatively movable surfaces, the pressure of the medium in a gap thereby being higher than the pressure in the matter which is to be prevented from leaking through the gap. Such a seal gives small friction losses, but the method is not an absolute guarantee for microbes being prevented from passing the gap for example when the pressure of said medium ceases. Nor can a chemically germicidal agent be used, since the medium is normally pressed into the space in which the process in question takes place, and the process would be disturbed by such a medium.

It is also known, e.g. by SE-B-7609594, to supply steam to a sealing device for a shaft passage through a wall, whereby the high temperature of the steam is germicidal. This arrangement is comparatively expensive and complicated with steam conduits, condenser, return conduits etc.

The object of the present invention is to provide an arrangement of the kind mentioned above, which is simple and compact as well as inexpensive to install and to operate. This is obtained by means of a device which has the characterizing features stated in claim 1.

Such a device can be used at, for example, a shaft passage in a separator or the like.

The invention is described in detail in the following with reference to the accompanying drawing, in which figures 1-4 show longitudinal sections of various embodiments of the invention.

Figure 1 shows a first element 1, e.g. a rotatable shaft, and a second element 2, e.g. a housing. The shaft is arranged through a bore in the housing, and the gap between the two elements is sealed off by the fact that the element 1 is provided with a disk 3 and the element 2 is provided with a ring 4 with a surface facing one surface of the disk. The ring 4 is connected to the element 2 by an annular resilient member 5 which surrounds

the element 1. The gap between the elements 1 and 2 is thus limited by the opposing surfaces on the disk 3 and the ring 4. The elements adjacent the gap are made of heat resistant material, and means are provided for heating at least a portion of the gap. The disk 3 may be made of a ceramic material and the surface of the ring 4 facing the disk 3 may be provided with a portion 6 of a gas permeable material, e.g. a sintered compound. A gas can be brought to the portion 6 via a conduit 7 and be spread in the gap between the disk 3 and the ring 4. The amount of gas flowing out of the gap per time unit is comparatively small.

A particular heatable body is arranged in one of the surfaces limiting the gap. The heatable body is formed as a loop 9 which, in the embodiment shown in figure 1, is inserted in the ring 4 at one rim of the gap between the disk 3 and the ring 4. Thereby it is avoided that a gas which is heated to a high temperature flows out at the other rim of the gap.

As shown in figure 2 the gap can be situated between a rotatable disk 10 and a member 11 which surrounds the disk and is provided with an annular recess 12 in which the peripheral portion of the disk is inserted. A heatable body 13 of annular shape is provided in the recess 12 between the periphery of the disk 10 and the radially outer limiting surface of the recess. The disk 10 can be supported on one or both sides by a gas layer. The gas can be supplied through conduits 14, 15 to gas permeable bearing layers 16, 17 between which the disk is situated. The disk may be connected to a shaft by a resilient membrane 18, whereby the shaft can be permitted to move axially.

Figure 3 shows an arrangement without external gas supply. If the gaps on both sides of the disk 19 are of different size, there will be a certain flow of fluid in a desired direction even when there is no pressure difference between the fluids situated on either side of the disk 19.

Figure 4 shows a rotor 20 supported by a gas bearing with pressurized gas supply through a conduit 21 in an element 22. A gap exists between opposing flat surfaces on the rotor 20 and the element 22, respectively, when the device is in operation. A layer 23 of a gas permeable material is arranged on the element 22 in connection to the gap. The pressurized gas is fed to the gap through this layer. A heatable body 24 is arranged in the gap on the element 22 and encloses the layer 23. Outlet channels 25 for the gas supplied to the gas bearing may possibly be provided in the element 22. These channels may end in the flat surface of

the element 22 between the layer 23 and the heat emitting loop 24. Therewith it is avoided that the gas flow cools the hot loop when the device is in operation.

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Claims

1. A device for disinfecting a gap between two elements which are movable in relation to each other, characterized in that a particular heatable body (9, 13,24) in the shape of a heat emitting loop is provided in connection to the gap in heat exchanging contact with a medium which fills the gap.

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2. A device according to claim 1, in which the elements consist of a rotatable disk (10) and a member (11) encloseing the disk and provided with an annular recess (12) in which the peripheral portion of the disk is inserted, a heatable body - (13) being arranged in the recess so that it encloses the periphery of the disk.

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3. A device according to claim 1, in which each element (20,22) has a flat surface limiting the gap, means (20,23) for supplying a pressure medium to the gap in order to support one element freely rotatable on the other element being provided in said other element, a heatable body (24) being arranged in the gap adjacent the surface of said other element and surrounding said means.

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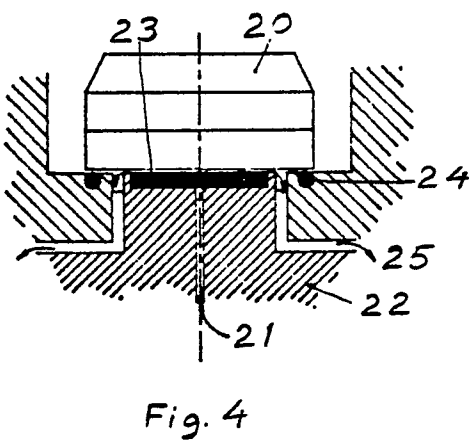
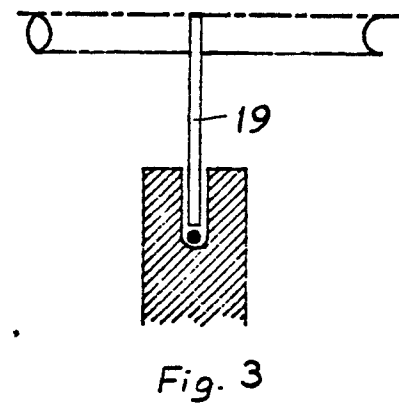
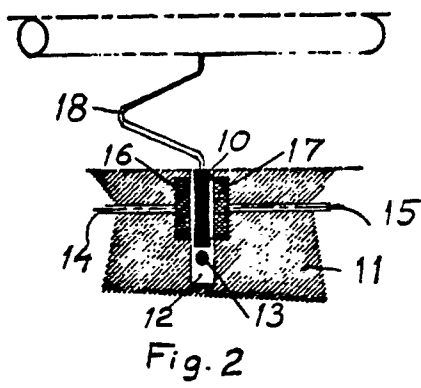
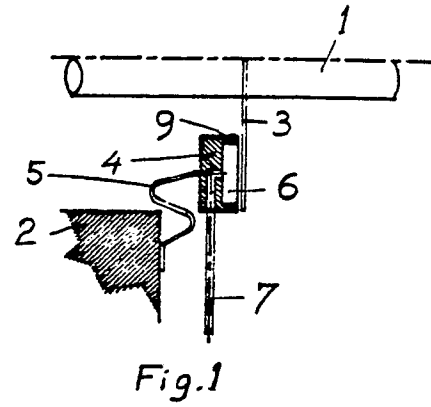
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
A	FR-A-2 335 599 (EKATO-WERK ERIC KARL TODTENHAUPT) * Figure; claim 1 * & SE-B-7 609 594 (Cat. D) -----	1	F 16 J 15/16 A 23 G 9/30
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			F 16 J A 61 L A 23 G
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 03-04-1987	Examiner NARMINIO A.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	